

U.S. Pat App. No. 10/813,829
Amendment A in response to
Office Action mailed 06/27/2006
Page 5
Atty Dkt No. LMRX-P037/P1258

Remarks/Arguments

Applicants wish to thank the Examiner for the careful review of the claims, specification and drawings.

Claims

Claims 1-34 have been cancelled.

New independent claims 35 and 45 have been added.

New dependent claims 36-44 and 46-49 have been added.

After entry of this amendment, claims 35-49 are pending.

It is respectfully submitted that each and every feature recited in the amended drawing, specification and/or amended claims are fully supported in the specification as filed. No new subject matter has been added.

Discussion of New Claims

Claims 35-44

Applicant hereby adds new independent claim 35, as follows:

35. (New) A method for selecting an endpoint indicator in plasma processing, the method comprising:

providing at least one frequency;

etching at least one sample substrate using the at least one frequency;

determining at least one calibrating endpoint by performing an empirical analysis on the at least one sample substrate;

etching at least one test substrate using the at least one frequency, the at least one test substrate being etched beyond the at least one calibrating endpoint;

measuring at least one parameter over at least one time range when etching the at least one test substrate, the at least one time range including the at least one calibrating endpoint;

comparing data pertaining to a plurality of harmonics for the at least one parameter, the data pertaining to the at least one calibrating endpoint; and

U.S. Pat App. No. 10/813,829
Amendment A in response to
Office Action mailed 06/27/2006
Page 6
Atty Dkt No. LMRX-P037/P1258

selecting the endpoint indicator based on the comparing, the endpoint indicator including a harmonic for a parameter from the plurality of harmonics for the at least one parameter.

Support of the new independent claims 35 and associated new dependent claims can be found in, for example, [0012], [0023]-[0027], and [0035] as well as FIG. 3 of the application.

The Office Action has cited Turner et al. (US Patent 5,576,629), hereinafter "Turner", as a reference.

Applicant respectfully submits that Turner does not teach or suggest the method of the new independent claim 35.

Specifically, Turner teaches determining a plurality of normalized endpoint values pertaining to a plurality of process parameters using a plurality of endpoint normalization instructions. (Col 4 lines 14-30, claim 15) Turner further teaches applying a plurality of endpoint tests to determine the existence of an endpoint. (Col 4 lines 34-36, Col 17 line 65 to Col 18 line 5) However, Turner does not teach or suggest selecting an endpoint indicator by comparing data pertaining to a plurality of harmonics, wherein the data are pertaining to at least one calibrating endpoint, as required by the new claim 35.

As such, Applicant respectfully submits that the new claim 35 is novel, nonobvious, and patentable. It is also respectfully submitted that the new claims 35-44 that depend from the new claim 35 are also novel, nonobvious, and patentable not only due to their recitations of independently patentable features but also due to their dependence from the patentable parent new claims 35.

Claims 45-49

Applicant hereby adds new independent claim 45, as follows:

45. (New) A method for detecting an endpoint in plasma processing at a given frequency, the method comprising:

etching a sample substrate at the given frequency;

U.S. Pat App. No. 10/813,829
Amendment A in response to
Office Action mailed 06/27/2006
Page 7
Atty Dkt No. LMRX-P037/P1258

determining a calibrating endpoint by performing an empirical analysis on an etched location of the sample substrate;

etching at least one test substrate at the given frequency, the at least one test substrate being etched beyond the calibrating endpoint;

measuring at least one parameter over a time range when processing the at least one test substrate, the time range including the calibrating endpoint;

comparing data pertaining to a plurality of harmonics for the at least one parameter, the data pertaining to the calibrating endpoint;

selecting a harmonic for a parameter from the plurality of harmonics for the at least one parameter as an endpoint indicator based on the comparing;

setting at least one criterion pertaining to the harmonic for the parameter for indicating the endpoint;

etching a production substrate at the given frequency;

monitoring the harmonic for the parameter when etching the production substrate; and signaling the endpoint when the at least one criterion is met.

Support of the new independent claims 45 and associated new dependent claims can be found in, for example, [0012], and [0023]-[0036] as well as FIGs. 3-7 of the application.

The Office Action has cited Turner et al. (US Patent 5,576,629), hereinafter "Turner", as a reference.

Applicant respectfully submits that Turner does not teach or suggest the method of the new independent claim 45.

Specifically, Turner teaches determining a plurality of normalized endpoint values pertaining to a plurality of process parameters using a plurality of endpoint normalization instructions. (Col 4 lines 14-30, claim 15) Turner further teaches applying a plurality of endpoint tests to determine the existence of an endpoint. (Col 4 lines 34-36, Col 17 line 65 to Col 18 line 5) However, Turner does not teach or suggest selecting an endpoint indicator by comparing data pertaining to a plurality of harmonics, wherein the data are pertaining to at least one calibrating endpoint, as required by the new claim 45. Further, Turner does not teach using one single selected endpoint indicator to detect an endpoint as required by the new claim 45.

U.S. Pat App. No. 10/813,829
Amendment A in response to
Office Action mailed 06/27/2006
Page 8
Atty Dkt No. LMRX-P037/P1258

As such, Applicant respectfully submits that the new claim 45 is novel, nonobvious, and patentable. It is also respectfully submitted that the new claims 45-49 that depend from the new claim 45 are also novel, nonobvious, and patentable not only due to their recitations of independently patentable features but also due to their dependence from the patentable parent new claims 35.

For the aforementioned reasons and others, it is respectfully submitted that the pending claims are novel, non-obvious, and patentable over the cited arts of record, taken alone or in combination. No new subject matter has been added.

No new subject matter has been added.

U.S. Pat App. No. 10/813,829
Amendment A in response to
Office Action mailed 06/27/2006
Page 9
Atty Dkt No. LMRX-P037/P1258

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Conclusion

In view of the discussion herein, Applicants believe that all pending claims are allowable and respectfully request a Notice of Allowance for this application from the Examiner. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at 408-257-5500.

Applicants petitions for (2) two-month(s) extension of time and encloses a credit card payment form in the amount of \$450.00 in payment of the extension of time request. However, the Commissioner is authorized to charge any fees beyond the amount enclosed which may be required, or to credit any overpayment, to Deposit Account No. 50-2284 (Order No. LMRX-P037/P1258).

Respectfully submitted,

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